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environmental assessment
modify wastewater treatment plant

ORIGINAL

GRAND CANYON
SOUTH RIM

NATIONAL PARK / ARIZONA

ENVIRONMENTAL ASSESSMENT

MODIFY WASTEWATER TREATMENT PLANT, SOUTH RIM

GRAND CANYON NATIONAL PARK
Arizona

September 1985

U.S. Department of the Interior
National Park Service
Denver Service Center

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PURPOSE AND NEED FOR ACTION

The South Rim Village is the major developed area in Grand Canyon National Park. The South Rim wastewater treatment plant receives all wastewater from the South Rim Village. Effluent from this secondary plant goes either to lagoons or to the wastewater reclamation plant. The reclamation plant provides reclaimed water for irrigation, car and bus washing, boiler feed water, and toilet flush water in some public restrooms. The re-use of treated wastewater is essential to this area where water is such a scarce and valuable resource.

The wastewater treatment and disposal facilities, and the reclamation plant have been cited by the Arizona Department of Health Services as requiring correction of major deficiencies. These deficiencies include the inability to meet discharge requirements at the outfall following the lagoons, the inability to meet water quality requirements at the reclamation plant, and a reclamation plant which is basically worn out. In addition, the wastewater treatment plant has a number of other operational problems which include the lack of adequate pretreatment, poor mixing and aeration of activiated sludge in aeration basins, and aerobic digesters with poor aeration and which are difficult to decant.

The National Park Service proposes to rehabilitate the South Rim wastewater treatment plant and replace the wastewater reclamation plant. The objective is to provide a reliable, energy efficient, easily operated facility that will meet state discharge standards and provide reclaimed water that will meet required water quality standards.

AFFECTED ENVIRONMENT

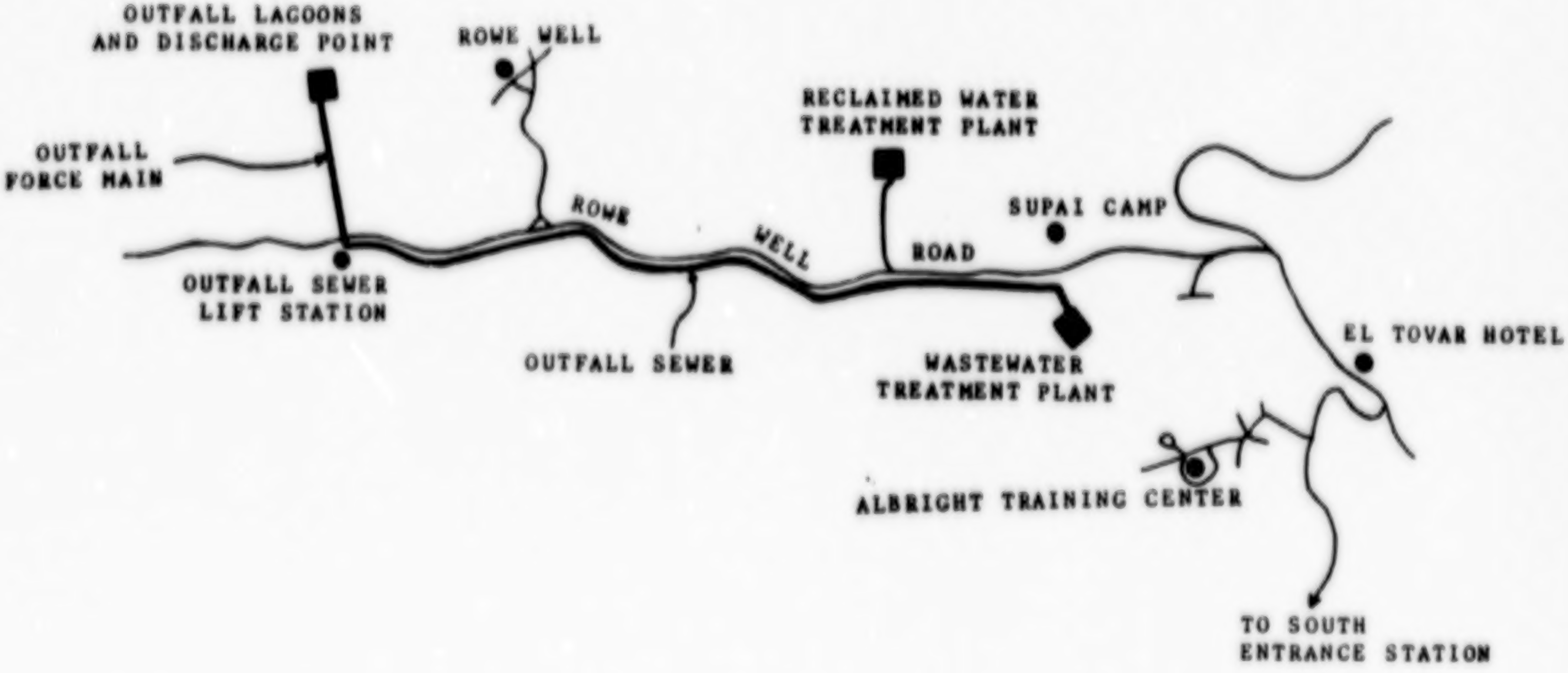
EXISTING CONDITIONS

Location and Access

The secondary wastewater treatment plant and water reclamation plant are located southwest of the South Rim Village development. These facilities are approximately 0.3 mile apart and are accessed via roads off of Rowe Well Road. The outfall lagoons are located about 2.5 miles southwest of these plants near the park's southern boundary (see Existing Facilities Map).

Wastewater Treatment and Water Reclamation Facilities

A secondary wastewater treatment facility and a water reclamation plant were constructed at a single site southwest of the South Rim Village in 1926. A remote outfall lagoon received plant bypasses, laundry brine wastes, and waste sludge. The reclamation plant is still in operation. However, a new secondary wastewater treatment plant was constructed in 1972 at a site northeast of the reclamation plant. Also, at that time the outfall lagoons were expanded to four ponds. The sewage collection and reclaimed water distribution system have been gradually expanded over the years.


OUTFALL LAGOONS AND DISCHARGE POINT
ROWE WELL
RECLAIMED WATER TREATMENT PLANT
OUTFALL FORCE MAIN
ROWE WELL ROAD
SUPAI CAMP
OUTFALL SEWER LIFT STATION
OUTFALL SEWER
WASTEWATER TREATMENT PLANT
EL TOVAR HOTEL
ALBRIGHT TRAINING CENTER
TO SOUTH ENTRANCE STATION

EXISTING

SOUTH RIM WASTEWATER TREATMENT AND DISPOSAL FACILITIES

PROJECT VICINITY MAP, GRAND CANYON NATIONAL PARK

The treated effluent from the secondary plant is either pumped to the water reclamation plant or pumped south through a 13,000 foot long 16-inch sewer line to the lagoons. Vault toilet and portable toilet wastes are hauled to the lagoons also. During portions of the year, effluent overflow from the final lagoon enters into Bright Angel Wash Creek. This water flows into ponds outside of the park boundary that are used for stock watering by local ranchers.

The secondary plant consists of the following major facilities: Pretreatment structure, 3 aeration basins, 1 clarifier, 2 aerobic digesters, 6 drying beds, and the control building. Major problems with the plant include generally inadequate pretreatment works which lack grit or coarse solids removal, inadequate sludge aeration/mixing, lack of a backup clarifier, and aeration basins and drying beds in need of some structural repairs.

The majority of the effluent from the secondary plant is routed to the lagoons. The existing lagoons are of insufficient volume for total evaporation which results in almost a yearround discharge at the outfall lagoons. The secondary effluent produces substantial algae growth at the discharge from the lagoons. Algae growth is further stimulated by sludge accumulations in the lagoons resulting from secondary plant bypasses during plant upsets. In addition, raw sewage from Supai Camp bypasses the secondary plant and flows directly into the outfall sewer line and into the lagoons. The park has a NPDES permit issued by the Arizona Department of Health Services (ADHS) that permits a discharge to Bright

Angel Wash. The effluent requirements of the permit represent a disinfected secondary effluent. The state has reported violations for carbonaceaous biochemical oxygen demand (BOD), algae (TSS), and pH, and has suggested bypassing the lagoons and discharging directly into the wash. In addition, they have requested flow monitoring and disinfection of the lagoon overflow.

A portion of the secondary effluent is pumped to the water reclamation plant for processing to supply reclaimed water needs in the park. The effluent flows through a clarifier, then into filters, after which it is disinfected. Effluent then flows to the nearyby 300,000 gallon stroage tank and pump station, from which water is pumped through the reclaimed water system that services the South Rim Village. A loading station is also located at the reclamation plant site for tank truck haulers. The reclamation plant is nearly 60 years old and is essentially worn out. The reclamation plant has been cited by the ADHS as not meeting discharge standards.

Sewage Flow and Reclaimed Water Demand

The estimates of existing and projected sewage flow and reclaimed water demand presented below are from McLaughlin (1985).

Table 1: Sewage Flow and Reclaimed Water Demand

	Actual 1984 (MGD)	Projected 2007 (MGD)
Secondary Plant Average Daily Flow (maximum month)	.475	0.70
Maximum Daily Flow	.602	0.90
Reclamation Plant Average Daily Flow (maximum month)	.08	.25
Maximum Daily Flow	.13	.35

The secondary plant has a design capacity of 0.45 MGD. During peak use, flows are routed to the outfall lagoons. The reclamation plant has a capacity of 0.13 MGD. During peak irrigation use the plant operators report that the plant cannot meet demand.

The major use of reclaimed water is summer irrigation. In addition, there are other comparitively minor water uses such as toilet flush water, car washing, and hauled water by nonpark users (i.e. - Tusayan, stockmen, U.S. Forest Service (USFS) slurry bombers). The concessioner has been converting over public toilet flushing supply from reclaimed water to potable water due to the poor water quality and unreliable supply produced by the reclaimed plant. Projected reclaimed water figures assumed a 50 percent increase in park irrigation demand (Apache St., residential areas, etc.). It is believed that the USFS local ranchers, and Tusayan would utilize additional reuse water beyond .35 MGS if it were available.

NATURAL ENVIRONMENT

Soils/Topography

Soils along the South Rim are derived from the underlying Kaibab limestone bedrock and a few remnant patches of siltstone. These soils are thin (averaging approximately 6 inches), stoney, poorly developed, very low in organic content, and subject to dessication during the summer. The terrain is predominantly level with an upslope approach to the rim. The secondary plant and reclamation plant are approximately at an elevation of 6,780 feet, and the lagoon area is at an elevation of 6,680 feet.

There is no prime farmland in the vicinity of this project.

Vegetation/Wildlife

The project is in an area of mixed woodland stands of pinyon, juniper, and ponderosa pine. These woodlands are open and dry with much exposed, bare, and rocky ground. Principal species include ponderosa pine (Pinus ponderosa), Colorado pinyon pine (Pinus edulis), Utah juniper (Juniperus ostersperma), and Gambel oak (Quercus gambellii). The ground cover is sparse, consisting of scattered grasses, forbs, and low shrubs such as big sagebrush, serviceberry, rabbitbrush, and blue gramma. Most of the vegetation in the project areas has been affected by human activity to some degree. Within the fenced perimeter of the treatment plant site and reclamation plant site, vegetation is impacted by the operation and maintenance activities associated with these facilities. Vegetation is primarily grasses with some scattered pinyon pine, junipers, and ponderosa pines. The alignment of the existing outfall sewer line was cleared of vegetation during construction. Reinvasion by native species, particularly dominant species, has been slow.

No federally listed or proposed threatened or endangered plant species, (Federal Register, July 20, 1984) exist in the vicinity of this project. One candidate species may occur in the vicinity of the village. The preferred habitat of *Clematis hirsuitissima* var. *arizonica* (clematis) is found in the village area and along the South Rim at 7,000 to 8,000 feet in the transition life zone. Park staff will conduct a reconnaissance of the project areas before construction to confirm if this species was present to make a determination of impact or no impact. If this reconnaissance should locate this species and determine that it would be adversely impacted by the project, the National Park Service would initiate further consultation with the U.S. Fish and Wildlife Service to identify possible mitigating measures.

Resident birds, particularly Steller's jays, pinyon jays, and ravens are plentiful along the South Rim. At least 40 other species are either seasonally or perennially common. Small mammals that are common include the Abert squirrel, rock squirrel, pocket gopher, deer mouse, house mouse, and pinyon mouse. The only large mammal frequently observed is the mule deer. Others less frequently seen include coyote, and gray fox. There are no known federally listed threatened or endangered wildlife species residing in or frequenting the project area.

Water Resources

The primary drainage in the project area is the Bright Angel Wash, near the secondary plant. This wash drains to the south and southwest, and passes outside of the park's southern boundary in the vicinity of the outfall lagoons.

Flow in this wash is more ephemeral than intermittant. As the stream is near the beginning of its watershed that originates at the South Rim, water infiltration into the underlying Kaibab limestone is rapid and the water table is far below the stream course. Surface flow seldom lasts more than one to two hours after a storm. However, where this wash lies in proximity to the outfall lagoons, an almost year-round overflow from these lagoons empties into this wash. Where this drainage exits the park's southern boundary the lagoon overflow flows into stock ponds used for stock watering.

There is no source of fresh water that can be exploited economically in the village area. Water for domestic use and fire suppression needs for all South Rim park and concession facilities is supplied by way of the transcanyon pipeline.

Water is a scarce and valuable resource in this area. Outside use, such as irrigation and car washing, using potable water is not allowed in the park. Therefore reclaimed or reuse water is an important supplemental water supply.

The project would not be located in or adjacent to wetlands or floodplains as defined in Executive Order 11990 and Executive Order 11988. No compliance with these executive orders is required.

Air Quality

Grand Canyon National Park is classified as a Class I air quality area in accordance with the Clean Air Act. This classification allows the least increase in ambient levels of pollutants.

CULTURAL RESOURCES

Archeology

Many prehistoric Native American archeological sites have been located on the South Rim of the Grand Canyon. These include sites associated with Desert Cultures and the Kayenta Phase of the Anasazi as well as more recent Navajo and Hopi sites. However, no known archeological sites are within the area of impact of the proposed project.

Historic Resources

The Water Reclamation Plant is listed on the National Register of Historic Places and the Historic American Engineering Record. Originally all water was transported to the Grand Canyon by railroad tank cars. In 1925, construction was begun on the water reclamation plant. The purpose of the plant was to provide a cheap source of water that could be used to water lawns, flush toilets and to supply steam railroad engines. The plant in recent years has not been effective in meeting water discharge standards. The Arizona Department of Health Services Bureau of Water Quality Control has cited the plant.

SOCIOECONOMIC ENVIRONMENT

Visitor Use

Visitor activity on the South Rim and in the village is primarily concentrated along the canyon rim. The secondary plant, reclamation plant, and lagoons are removed from any visitor facilities, with the exception of the kennel which is located immediately adjacent to the secondary plant.

The Region

Adjoining the southern border of the park is the Kaibab National Forest. Scattered throughout the national forest are privately owned lands. The major private property is the community of Tusayan, located about one mile south of the park along Arizona Highway 64.

Tusayan, local ranchers, and the USFS utilize reclaimed water provided by the NPS reclamation plant. Water is loaded at the plant site into tank trucks for transport out of the park. This water is primarily used for USFS slurry bombers, stock watering, and irrigation. The current price charged by the NPS for reclaimed water is $1.00 per 1,000 gallons of water. There is an additional charge of $.75/per 1,000 gallons if water is hauled by tank truck over park roads.

Local ranchers also utilize the overflow from the NPS outfall lagoons for stock watering. There have been no reports of health related problems with humans or stock, associated with using this overflow. However, this discharge does not comply with ADHS regulations.

A private residence is also located adjacent to the Bright Angel wash immediately outside of the park border. During power outages, the overflow from the lift station that pumps to the lagoons has been reported to flow onto this private property.

ALTERNATIVES

ALTERNATIVE A NO ACTION

The no action alternative would provide for the continued operation and maintenance of the existing wastewater treatment facilities and water reclamation plant. No major modifications or upgrading would be made to these facilities.

ALTERNATIVE B - MODIFY WASTEWATER TREATMENT PLANT (PREFERRED ALTERNATIVE)

This alternative proposes the modification of the existing wastewater treatment facility, construction of a new water reclamation plant at the site of the existing wastewater treatment plant, and minor improvements and extension of the sewage collection system. The new facilities would include the following.

Wastewater Collection

If funds are provided by the Indian Health Services a new 6-inch sewer line would be constructed from the Supai Camp to the treatment plant site to service several residences at that site. Length of this line would be about 1/4-mile.

A new 50,000 gallon tank buried behind the existing commercial laundry would handle most daily flows from the laundry. Laundry flows would be detained and released into the sewer system during late night or early morning hours to provide flow equalization for the treatment plant.

Wastewater Treatment

The selection of a treatment process was based on providing a process that would be reliable, could be operated at varying flow rates, would require relatively simple operation, would incorporate existing facilities where possible, and would meet ADHS effluent standards. Based on these criteria the wastewater treatment facilities would consist of the following components (a more detailed description of the design analysis and process selection is contained in McLaughlin, 1985)

pretreatment - This would include the removal of grit, rags, and larger trash, paper or other items from the wastewater flow, and measuring and recording of influent wastewater flowrate.

secondary treatment - This would include the removal of carbonaceous biochemical oxygen demand (BOD) and suspended solids from the wastewater. The basic secondary treatment would be an extended aeration activiated sludge process.

sludge management - This would include stabilization and disposal of the solids collected or generated within the sewage treatment process. Aerobic digestion would involve the extended aeration of sludge, which would result in a decrease in volatile sludge solids. Air dry beds would be used as the dewatering process.

advanced waste treatment - This would include floculation, clarification, filtration, and disinfection to further reduce solids and remove harmful organisms from the wastewater. Advanced treatment is required wherever secondary treatment would not result in an effluent of acceptable quality for discharge or reuse. For reclaimed water, a multi-media filter followed by chlorine disinfection would be used. Chemical coagulation and floculation would proceed filtration to insure efficient solids removal. The filter would economically reduce suspended solids, and insure a high quality, aesthetically acceptable effluent for irrigation. Chlorination would kill bacteria and most viruses remaining in the effluent, and would reduce odor problems and threats to public health.

After all reuse needs have been met, any remaining secondary treated wastewater would be discharged into the Bright Angel Wash at the existing remote discharge location. The existing outfall line to the discharge site would be modified so that it could be used for gravity flow. This would entail encasement of open piping in manholes by sliplinging or the removal of mahholes and replacing them with sections of pipe. Maholes are located every 550 feet along the length of the 13,000 foot sewer line.

The ADHS standards for the quality of discharge and reuse water are as follows:

	Reuse Water	Discharge Into Bright Angel Wash
BOD	(a)	30 mg/l maximum
Suspended Solids	(a)	30 mg/l maximum
Fecal Coliform	less than 25/100 ml	less than 200/100 ml
Turbidity	less than 5.0 NTU maximum	-

(a) No numerical limit, but better than secondary effluent is assumed to be required.

The quality of discharge and reuse water would meet or be more restrictive than ADHS standards and would be as follows:

	Reuse Water	Discharge Into Bright Angel Wash
BOD	5.0 mg/l maximum	30 mg/l maximum
Suspended Solids	2.0 mg/l maximum	30 mg/l maximum
Fecal Coliform	less than 25/100 ml	less than 200/100 ml
Turbidity	5.0 NTU maximum	-

The intial capacity of the secondary plant would be approximately 0.75 MGD, with convenient expansion capability to the predicted ultimate size of 0.9 MGD. The approximately 0.7 MGD.

In summary, major project improvements would include:

New pretreatment building - includes flow measurement, coarse screening and grit removal.

A new 450,000 gallon aeration basin. Replacement of aeration equipment in the existing basin.

A new secondary clarifier with attendant slude and scum pumps.

An aerobic digester, designed for decanting and sludge stabilization as required before placing on the existing (rebuilt) drying beds.

Converstion of the existing digesters to flow leveling basins.

A new reclamation (AWT) treatment plant including chemical feed, flocculation, clarification filtration using mixed media, and chlorination.

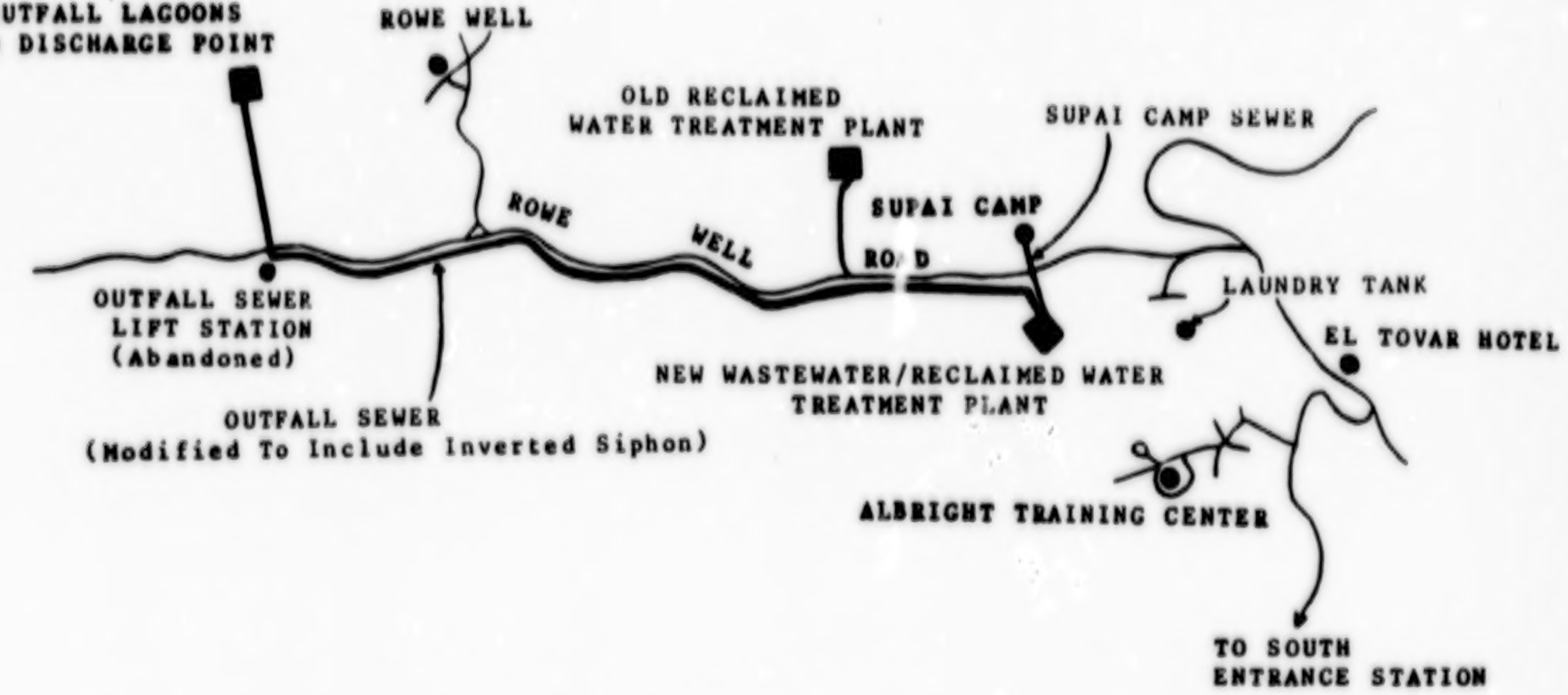
Support facilities, including an expanded laboratory and shop area, and architectural coordination with existing buildings.

Encasement of the existing outfall sewer manholes so that this main can be used as a gravity unit bypass. The lagoons would be used primarily for emergency treatment and evaporation of excess secondary treated water.

A new 1/4-mile-long sewerline to service Supai Camp.

A buried 50,000 gallon flow equalization tank located behind the commercial laundry.

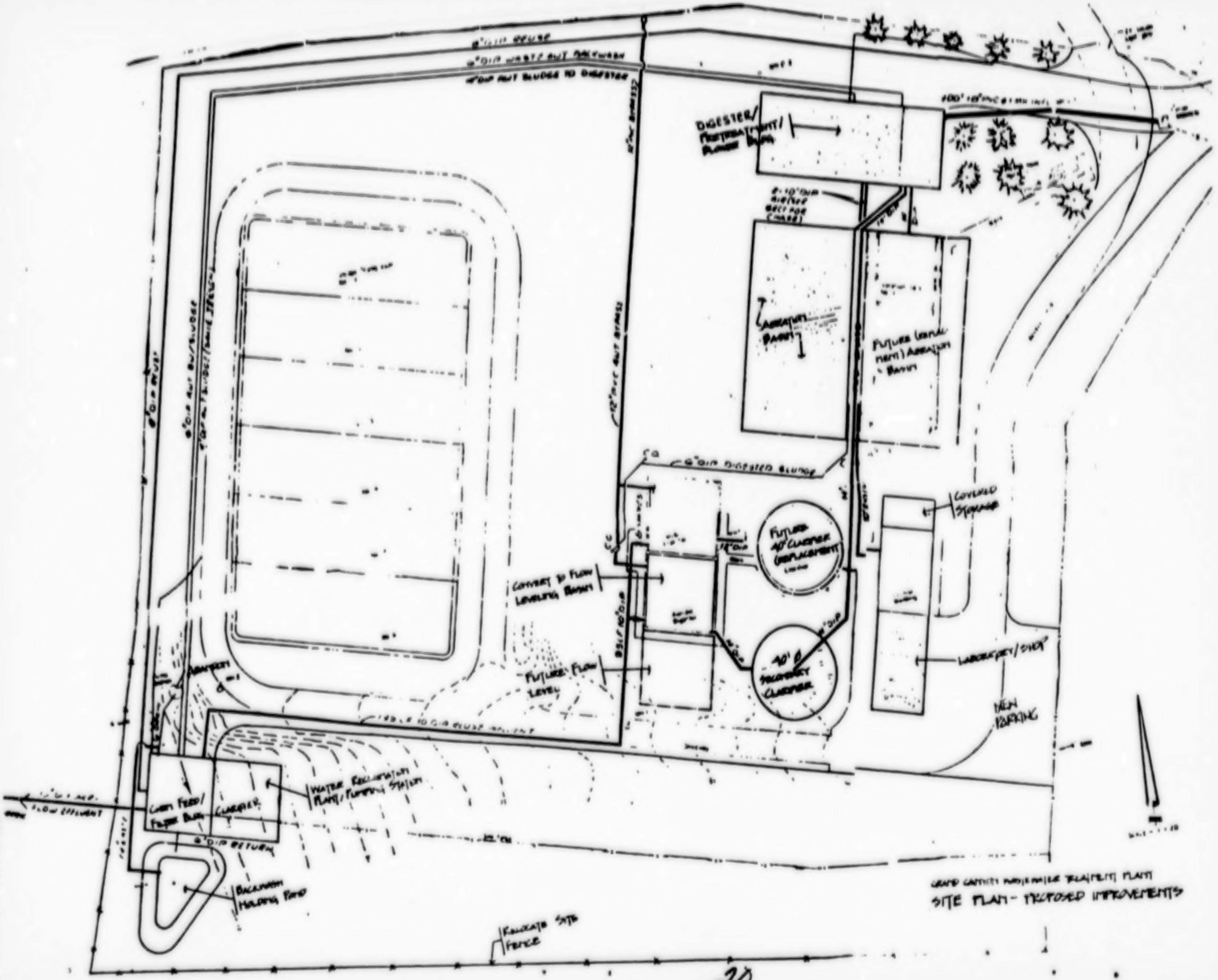
(See Proposed Facilities and Site Plan Maps).


OUTFALL LAGOONS AND DISCHARGE POINT
ROWE WELL
OLD RECLAIMED WATER TREATMENT PLANT
SUPAI CAMP SEWER
ROWE WELL ROAD
SUPAI CAMP
LAUNDRY TANK
EL TOVAR HOTEL
OUTFALL SEWER LIFT STATION (Abandoned)
NEW WASTEWATER/RECLAIMED WATER TREATMENT PLANT
OUTFALL SEWER (Modified To Include Inverted Siphon)
ALBRIGHT TRAINING CENTER
TO SOUTH ENTRANCE STATION
2000 0 2000 4000
SCALE OF FEET

PROPOSED

SOUTH RIM WASTEWATER TREATMENT AND DISPOSAL FACILITIES

PROJECT VICINITY MAP, GRAND CANYON NATIONAL PARK



GRAND CANYON WASTEWATER TREATMENT PLANT
SITE PLAN - PROPOSED IMPROVEMENTS

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A NO ACTION

Impacts on Natural Environment

The quality of the effluent discharged into the Bright Angel Wash would be in violation of ADHS water quality standards. The discharge of effluent will continue to alter the plant species composition and density along the Bright Angel Wash because of increased moisture and nutrients available locally to plants. Discharge impounded outside of the park would continue as a water source for wildlife as well as stock animals. No deleterious affects on wildlife or stock animals due to drinking of effluent have been documented. However, the potential for harmful affects from drinking of poor quality effluent would still exist.

Impacts on Cultural Environment

This alternative would have no impact on known archeological resources. Because of the failure of the reclamation plant to meet ADHS water quality standards, it eventually could be the subject of closure by the state. An unplanned closure could result in unforeseen impacts to the structure, such as structural deterioration or vandalism.

Impacts on Socioeconomic Environment

Health problems could occur with the quality of treated water (both reclaimed water and secondary plant effluent) that is currently being produced. Effluent discharged at the lagoon site would pose a minimal hazard to the general public because of its isolated location. However, local residents and ranchers may come into contact with the poor quality effluent and would thus be subject to potential health hazards from pathogenic organisms such as viruses, bacteria, and protozoans.

The reclamation plant would continue to produce reclaimed water that is of substandard quality. Continued poor filtration would result in high levels of suspended solid matter in the water. These suspended solid particles could act to shield pathogens from the oxidizing action of the chlorine and could also react chemically to reduce chlorine residuals. Visitors, park and concessioner residents and employees, and nonpark users of reclaimed water may experience partial body contact with reclaimed water used for irrigation or vehicle washing. In addition, vegetables from gardens irrigated with reclaimed water may be eaten with little or no washing or preparation. Thus, pathogenic organisms that may survive during periods of low chlorine residual maintenance would pose a potential public health hazard to those individuals coming in contact with or ingesting vegetables irrigated with reclaimed water.

Because ADHS water quality standards are routinely violated by the secondary plant and reclamation plant, these facilities could be subject to a cease and desist order filed by the ADHS. Closure of the reclamation plant would eliminate outside uses of water in the park (outside use of potable water is prohibited in the park). There would also be no reclaimed water available for hauling by non-park users. Closure of the secondary plant would likely result in closure of South Rim Village facilities.

ALTERNATIVE B - MODIFY WASTEWATER TREATMENT PLANT

Impacts on Natural Environment

Less than 0.5 acre of previously disturbed soils would be disrupted from construction of the proposed wastewater treatment facilities. Modifying the existing outfall sewer line to the lagoons would result in minimal, less than 0.3 acre, disturbance to soils surrounding the manholes and compaction of soils along the sewer line alignment which would be used as the access route for construction equipment and personnel. Placement of the new sewer line to Supai Camp would disturb less than 0.3 acre of land.

Excavation and associated construction activity would remove or crush vegetation. The acreage of vegetation impacted would be similar to acreage for soil impacts. Affected vegetation would primarily be understory species. Any trees (pinyon pine, juniper, and ponderosa pine) within construction limits would be removed and those bordering the limits might be adversely affected due to disturbance of root systems and inadvertant scarring. It is expected that with the new and enlarged capacity of the water reclamation facility, that the quality and quantity of reuse water will be increased, resulting in increased use of reclaimed water and reduced discharge into the Bright Angel Wash. This would result in a subsequent reduction in vegetation in the Bright Angel Wash downstream of the discharge site in response to the reduced availability of moisture and nutrients.

A field reconnaissance for the candidate species, Clematis hirsuitissima var. arizonica would occur prior to construction. No impact on endangered or threatened plant species is anticipated as none exist in the area.

Minor impacts on wildlife would occur. Small mammals or birds species inhabiting construction areas would be temporarily disturbed or displaced by construction activities. A reduction in the quantity of discharge would also result in less water available for wildlife outside park, forcing wildlife to seek additional or other sources of water. There would be no impact to endangered or threatened wildlife species, as none exist in the area.

There would be no impacts on floodplains or wetlands.

Erosion and disturbance to soils and vegetation would be minimized by limiting construction to the smallest area possible and the fact that the majority of construction would occur in previously disturbed areas near the existing secondary plant and outfall sewer line. Other mitigating measures would include the use of rubber-tired vehicles in off-road areas outside of the secondary plant site, aerating the soil following compaction by construction activities, and parking of vehicles in designated areas. Seeding, planting, and mulching of disturbed areas with native species, including selective screening of the treatment facilities, would be undertaken. The following species would be appropriate for revegetation: Utah juniper, pinyon pine, snowberry, sagebrush, rabbitbrush, blue gramma, squirreltail, and sand dropseed. Pending availability of these species, other native species may be substituted upon approval of the Resources Management and Planning Division of Grand Canyon National Park.

Impacts on Cultural Resources

This alternative may disturb previously undiscovered archeological sites. However, prior to undertaking any ground disturbing activity, an archeological survey and clearance would be required according to NPS policies.

Because the reclamation plant has reached the end of its useful life, a new water reclamation plant would be constructed. An alternatives study for the potential uses of the reclamation plant has been prepared analyzing the potential uses of the plant and its possible adaptive use.

The alternatives examined in that study will be used in developing further compliance actions under Section 106 of the National Historic Preservation Act.

Impacts on Socioeconomic Environment

The increased capacity and improved functioning and reliabilty of the wastewater treatment facilities along with routing of raw sewage from Supai Camp and South Rim chemical toilet wastes to these facilities would all contribute to improved wastewater quality. The quality of discharge water and reclaimed water would meet or be more restrictive than ADHS standards. Adequate wastewater treatment would permit South Rim facilities to remain open.

Some disease organisms would remain despite treatment, but threats to public health would be minimal because of the isolated location of the discharge site. Local residents or ranchers may still come into contact with discharged effluent or vectors which could transmit disease organisms. However, the improved treatment process would significantly increase wastewater quality. Modification of the outfall sewer to flow by gravity to the lagoon site would eliminate the need for the outfall sewer lift station and would also eliminate any unauthorized discharges onto private property.

An improved and efficient wastewater treatment operation would reduce park maintenance demands. A new laboratory would allow the park to retain its ADHS certification to take samples and thus allow the park to rapidly respond to correct any possible violations.

The improved and larger capacity reclamation facility would be capable of meeting increasing park reclaimed water demand, and also provide additional reclaimed water for non-park users such as USFS, Tusayan, and local ranchers.

It is expected that the improved quality and quantity of water produced by the new reclamation facility would result in more water being reused with a corresponding reduction of flow into the Bright Angel Wash. This reduction would result in less discharge available for use by ranchers for stock watering, thus requiring these users to contend with less water or seek another source. The park has no committment or responsibility to supply discharge water to these users.

Construction activities would have a minimal effect on visitors because the majority of construction would occur at sites removed from visitor facilities. Visitors using the concessioner laundry or placing pets at the kennel would be aware of construction occuring near these facilities and would be subject to construction noise and fumes. Residents of Supai Camp would be temporarily inconvenienced during sewerline construction and hookups.

Selective screening of new treatment facilities and an architectural style compatible with the surroundings would minimize any long-term visual impacts of the facilities.

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